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TITLE: METHOD FOR ACCESSING EMAIL ATTACHMENTS FROM A MOBILE VEHICLE

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METHOD FOR ACCESSING EMAIL ATTACHMENTS FROM A MOBILE VEHICLE

FIELD OF THE INVENTION

The invention relates generally to wireless communication devices for use in a vehicle. More specifically, the invention relates to a method and system for receiving email attachments in a vehicle.

BACKGROUND OF THE INVENTION

Telematic communication units (TCUs) such as cellular phones, personal data assistants (PDA's), Global Positioning System (GPS) devices, and on-board Vehicle Communication Units (VCU's), used in conjunction with a Wide Area Network (WAN), such as a cellular telephone network or a satellite communication system, have made it possible for a person to send and receive voice communications, data transmissions, facsimile messages and email messages virtually anywhere in earth. Such communication can be initiated at the telematics unit when it is turned on, or by entering a phone number to be called, or in some cases, by speaking a voice command to an automatic speech recognition system. In any case, the telematics unit automatically completes the process of dialing the number to be called, and thus establishes contact with the desired entity.

One limitation to using a telematics unit to retrieve email messages from a server-based information system is that attachments to the email message are generally not available to the user. This is due, in part to the fact that email attachments may be text, pictures, audio, or video recordings. It is therefore, necessary to first, download the attachment, and then route the attachment to a device that can make the content of the attachment available to the user.

It is therefore desirable to provide a system that would allow users to access email attachments in a vehicle.

SUMMARY OF THE INVENTION

One aspect of the invention presents a method for accessing email attachments from a vehicle. The method comprises receiving the email attachment from a remote server to a telematics control unit in the vehicle, determining the classification of the email attachment, and then routing the email attachment to a device that will make the content of the attachment available to the user.

Another aspect of the invention provides a computer readable medium for accessing email attachments from a vehicle. The computer readable medium comprises computer readable code within the vehicle telematics unit for receiving an email attachment that is stored on a remote server. The computer readable medium further comprises computer readable code for determining the classification of the email attachment, and routing the email attachment to one of a plurality of vehicle communication units based on the classification of the email attachment.

Another aspect of the invention provides a system for accessing an email attachment from a vehicle. The system comprises means for receiving an email attachment from a remote server, determining the classification of the email attachment, and routing the email attachment to one of a plurality of vehicle communication units based on the classification of the email attachment.

The foregoing and other features and advantages of the invention will become further apparent from the following detailed description of the embodiments of the invention, read in conjunction with the accompanying drawings. The detailed description and drawings are illustrative of the invention rather than limiting, the scope of the invention being defined by the appended claims and equivalents thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic diagram for one embodiment of a system for accessing email attachments from a vehicle using a wireless communication system, in accordance with the present invention;

FIG. 2 is a flowchart outlining one embodiment of a method for accessing email attachments from a vehicle utilizing the system of FIG. 1 in accordance with the present invention; and

FIG. 3 is a schematic diagram of an email attachment.

DETAILED DESCRIPTION OF THE INVENTION

FIG.1 is an illustrative operating environment for downloading an email to a mobile vehicle in an embodiment of the present invention. FIG. 1 shows a vehicle communication system **100**. Vehicle communication system **100** includes at least one vehicle **110** including telematics unit **120**, one or more wireless carrier systems **140**, one or more communication networks **142**, one or more land networks **144**, one or more client, personal or user computers **150**, one or more web-hosting portals **160**, and one or more call centers **170**. In one embodiment, vehicle **110** is implemented as a mobile vehicle equipped with suitable hardware and software for transmitting and receiving voice and data communications and emails.

Vehicle **110** is implemented as a motor vehicle, a boat, an airplane and any other mode of transportation. Vehicle **110** includes display screen **114**. In one embodiment, display screen **114** is a portion of a vehicle navigation system and the navigation system further includes a map stored in memory (in one example, memory **128**), and display software that can display the vehicle's current location on a display screen in the vehicle. The display screen **114** is implemented as a television in one embodiment, and is implemented as a monitor in other embodiments. The display screen may be any device configured to allow viewing of data or the visible output of computer files.

Vehicle **110** further includes audio device **112**. Audio device **112** is implemented as any device configured to play sounds audible to the human ear. Audio device **112** is a stereo system in one embodiment. For example, the audio device **112** is a component of the entertainment system of vehicle **110**. Both audio device **112** and display screen **114** are configured to provide the output of a computer file, such as an email attachment, in a form perceptible to a human. For example, audio device **112** is configured to "play" music files. Music files include files formatted as .mp3, .aiff,. ogg, and any other file format used to store audible information. In another example, display screen **114** is configured to visibly show the output of a computer file, such as an email attachment. For example, display screen **114** is configured to display text, pictures, or moving pictures from a computer file. Output for display screen **114**, for example, comes from word processing files, spreadsheets and .mov files. Both audio device **112** and display screen **114** are configured to allow display of any appropriate file, or email attachment. In this application, the audio device **112** and display screen **114** are collectively referred to as a "communications unit."

In one embodiment, telematics unit **120** is a vehicle communications unit that includes a digital signal processor (DSP) **122** connected to a wireless modem **124**, a global positioning system (GPS) unit **126**, an in-vehicle memory **128**, such as, for example, a non-volatile flash memory, a microphone **130**, one or more speakers **132**, an embedded or in-vehicle mobile phone **134**, and a wireless access point node **136**. DSP **122** is also referred to as a microcontroller, controller, host processor, ASIC, microprocessor, or vehicle communications processor. DSP **122**, in certain embodiments, is a functional block in a processor. GPS unit **126** provides longitude and latitude coordinates of the vehicle, as well as a time stamp. In-vehicle mobile telephone system **134** is a cellular-type phone, such as, for example an analog, digital, dual-mode, dual-band, multi-mode or multi-band cellular phone. In another example, the mobile telephone system is an analog mobile telephone system operating over a

prescribed band nominally at 800 MHz. In another example, the mobile telephone system is a digital mobile telephone system operating over a prescribed band nominally at 800 MHz, 900 MHz, 1900 MHz, or any suitable band capable of carrying digital cellular communications.

DSP **122** executes various computer programs and communication control and protocol algorithms that control communication, programming and operational modes of electronic and mechanical systems within vehicle **110**. In one embodiment, DSP **122** is an embedded system controller. In another embodiment, DSP **122** controls communications between telematics unit **120**, wireless carrier system **140**, and call center **170**. In another embodiment, DSP **122** controls communications between the wireless access point node **134** and nodes of a mobile ad hoc network. In one embodiment, a speech-recognition application is installed in DSP **122** to translate human voice input through microphone **130** into digital signals. DSP **122** generates and accepts digital signals transmitted between telematics unit **120** and a vehicle communication bus that is connected to various electronic modules in the vehicle **110**. In one embodiment, the digital signals activate a programming mode and operation modes, as well as provide for data transfers. Memory **128** comprises an internal software flag.

Vehicle **110**, via a vehicle communication bus, sends signals to various units of equipment and systems within vehicle **110** to perform various functions such as monitoring the operational state of vehicle systems, collecting and storing data from the vehicle systems, providing instructions, data and programs to various vehicle systems and calling from telematics unit **120**. In facilitating interactions among the various communication and electronic modules, vehicle communication bus utilizes bus interfaces such as controller-area network (CAN), J1850, International Organization for Standardization (ISO) Standard 9141, ISO Standard 11898 for high-speed applications, and ISO Standard 11519 for lower speed applications.

Vehicle **110**, via telematics unit **120**, sends and receives radio transmissions from wireless carrier system **140**. Wireless carrier system **140** is implemented as any suitable system for transmitting a signal from mobile vehicle **110** to communication network **142**. Wireless carrier system **140** incorporates any type of telecommunications in which electromagnetic waves carry signal over part of or the entire communication path. In one embodiment, wireless carrier system **140** transmits analog audio, digital audio (including, but not limited to, CDMA, TDMA, FDMA, GSM), video signals, or both. In an example, wireless carrier system **140** transmits analog audio,video signals, or both, such as those sent from AM and FM radio stations and transmitters, or digital audio signals in the S band (approved for use in the U.S.) and L band (used in Europe and Canada). In one embodiment, wireless carrier system **140** is a satellite broadcast system broadcasting over a spectrum in the "S" band (2.3 GHz) that has been allocated by the U.S. Federal Communications Commission (FCC) for nationwide broadcasting of satellite-based Digital Audio Radio Service (DARS).

Communication network **142** includes services from one or more mobile telephone switching offices and wireless networks. Communication network **142** connects wireless carrier system **140** to land network **144**. Communication network **142** is implemented as any suitable system or collection of systems for connecting wireless carrier system **140** to mobile vehicle **110** and land network **144**. In one example, wireless carrier system **140** includes a short message service, modeled after established protocols such as IS-637 SMS standards, IS-136 air interface standards for SMS, and GSM 03.40 and 09.02 standards. Similar to paging, an SMS communication could be broadcast to a number of regional recipients. In another example, the carrier system **140** uses services in accordance with other standards, such as, for example, IEEE 802.11 compliant wireless systems and Bluetooth compliant wireless systems.

Land network **144** is a public-switched telephone network (PSTN). In one embodiment, land network **144** is implemented as an Internet protocol (IP) network. In other embodiments, land network **144** is implemented as a wired network, an optical network, a fiber network, another wireless network, or any combination thereof. Land network **144** is connected to one or more landline telephones. Land network **144** connects communication network **142** to user computer **150**, web-hosting portal **160**, and call center **170**. Communication network **142** and land network **144** connects wireless carrier system **140** to web-hosting portal **160** and call center **170**. Client, personal or user computer **150** includes a computer usable medium to execute Internet browser and Internet-access computer programs for sending and receiving data over land network **144** and optionally, wired or wireless communication networks **142** to web-hosting portal **160** and vehicle **110**.

Web-hosting portal **160** includes one or more data modems **162**, one or more web servers **164**, one or more databases **166**, and a network **168**. In one embodiment, web-hosting portal **160** is connected directly by wire to call center **170**, or connected by phone lines to land network **144**, which is connected to call center **170**. In another embodiment, web-hosting portal **160** is connected to call center **170** without a direct wire connection, but with a connection allowing communication between the call center **170** and the web-hosting portal **160**. Web-hosting portal **160** is connected to land network **144** by one or more data modems **162**. Land network **144** sends digital data to and from modem **162**; data that is subsequently transferred to web server **164**. In one implementation, modem **162** resides inside web server **164**. Land network **144** transmits data communications between web-hosting portal **160** and call center **170**.

Web server **164** receives various data requests or instructions from user computer **150** via land network **144**. In alternative embodiments, user computer **150** includes a wireless modem to send data to web-hosting portal **160** through a wireless communication network **142** and a land network **144**. Data is received by modem **162** and sent to one or more web servers **164**. In one embodiment, web server **164** is implemented as any suitable hardware and software capable of providing web services to transmit and receive data from user computer **150** to telematics unit **120** in vehicle **110**. Web server **164** sends to or receives data transmissions from one or more databases **166** via network **168**. Web server **164** includes computer applications and files for managing emails to be sent to vehicle **110**.

In one embodiment, one or more web servers **164** are networked via network **168** to distribute data or emails among its network components such as database **166**. In an example, database **166** is a part of or a separate computer from web server **164**. In one embodiment, web-server **164** sends emails to call center **170** via modem **162**, and through land network **144**.

Call center **170** is a location where many calls are received and serviced at the same time, or where many calls are sent at the same time. In one embodiment, the call center is a telematics call center, facilitating communications to and from telematics unit **120** in vehicle **110**. In an example, the call center is a voice call center, providing verbal communications between an advisor in the call center and a subscriber in a mobile vehicle. In another example, the call center contains each of these functions. In other embodiments, call center **170** and web-hosting portal **160** are located in the same or different facilities.

Call center **170** contains one or more voice and data switches **172**, one or more communication services managers **174**, one or more communication services databases **176**, one or more communication services advisors **178**, and one or more networks **180**.

Switch **172** of call center **170** connects to land network **144**. Switch **172** transmits voice or data transmissions from call center **170**, and receives voice or data transmissions from telematics unit **120** in mobile vehicle **110** through wireless carrier system **140,** wireless access point node **136**, or both, communication network **142**, and land network **144**. Switch **172** receives data transmissions from, and sends data transmissions to, one or more web-hosting portals **160**. Switch **172** receives data transmissions from, or sends data transmissions to, one or more communication services managers **174** via one or more networks **180**.

Communication services manager **174** is any suitable hardware and software capable of providing communication services to telematics unit **120** in mobile vehicle **110**. Communication services manager **174** sends to or receives data transmissions from one or more communication services databases **176** via network **180**. Communication services manager **174** sends to or receives data transmissions from one or more communication services advisors **178** via network **180**. Communication services database **176** sends to or receives data transmissions from communication services advisor **178** via network **180**. Communication services advisor **178** receives from or sends to switch **172** voice or data transmissions.

Communication services manager **174** facilitates one or more services, such as, but not limited to, enrollment services, navigation assistance, directory assistance, roadside assistance, business or residential assistance, information services assistance, emergency assistance, and communications assistance and vehicle data management services. Communication services manager **174** receives emails with attachments from a user via user computer **150**, web-hosting portal **160**, and land network **144**. Communication services manager **174** transmits and receives operational status, instructions and other types of vehicle data to telematics unit **120** in vehicle **110** through wireless carrier system **140**, communication network **142**, land network **144**. Telematics unit **120**

communicates with call center **170** through wireless access point node **136** voice and data switch **172**, and network **180**. Communication services manager **174** stores or retrieves vehicle data and information from communication services database **176**. Communication services manager **174** provides requested information to communication services advisor **178**.

In one embodiment, communication services advisor **178** is a real advisor. In another embodiment, communication services advisor **178** is implemented as a virtual advisor. In an example, a real advisor is a human being at service provider service center in verbal communication with service subscriber in mobile vehicle **110** via telematics unit **120**. In another example, a virtual advisor is implemented as a synthesized voice interface responding to requests from telematics unit **120** in vehicle **110**.

Communication services advisor **178** provides services to telematics unit **120** in mobile vehicle **110**. Services provided by communication services advisor **178** include enrollment services, navigation assistance, real-time traffic advisories, directory assistance, roadside assistance, business or residential assistance, information services assistance, emergency assistance, and communications assistance. Communication services advisor **178** communicates with telematics unit **120** in mobile vehicle **110** through wireless carrier system **140**, communication network **142**, and land network **144** using voice transmissions, or through communication services manager **174** and switch **172** using data transmissions. Switch **172** selects between voice transmissions and data transmissions.

FIG. 2 is a flowchart outlining one embodiment of a method 200 for downloading an email attachment to a vehicle and making it available to a user. The method begins at step **202** wherein the user contacts the call center from a mobile vehicle. In one embodiment of the invention, the user employs the telematics control unit in the mobile vehicle to send a signal through the carrier system, the communications network, and a land network. A communications services manager at the server-based call center receives the signal. Within the call center, the signal may be routed to the virtual advisor and to the database. If the user has an email profile stored in the database, the server determines whether the user has received one or more email messages with an attachment. The user, for example, contacts the call center to determine the existence of email addressed to the user. In other examples, the user contacts the call center for any other call center service, such as navigational assistance, and in the same contact checks for the existence of email addressed to the user. In other embodiments, the telematics unit **120** is configured to contact the call center at predetermined intervals, selectable by the user, to determine the existence of such email. For example, the telematics unit contacts the call center every 2 hours to check on email. In other examples, the telematics unit **120** contacts the call center as part of the wake cycle as is known to those of ordinary skill in the art.

If one or more email messages with an attachment have been received, the virtual advisor asks the user whether he/she would like to receive the email attachment, as indicated in step **204**. The signal from the virtual advisor may be an electronic signal or may be verbal and audible if an automated speech recognition (ASR) unit is available within the call center. The signal from the virtual advisor is sent through the data transmission device in the call center to the user in the mobile vehicle. In one embodiment of the invention, the signal is sent through an Internet protocol network and a land network connected to a communication network and wireless carrier system, and is received at the telematics unit **120** in the user's mobile vehicle.

The user responds through the telematics unit by indicating either "yes" or "no" as indicated in step **206**. The user may respond either verbally, by speaking into a telephone, or by pressing a button that sends an electronic signal. The user's response is sent to the call center by the telematics unit **120**. If the user responds "no", as indicated in step **208**, no further exchange of information takes place, and the sequence is terminated. If the user responds "yes", the call center initiates a sequence of actions to prepare to send the email attachment to the user's mobile vehicle.

As indicated in step **210**, in response to a "yes" signal from the vehicle telematics unit **120**, the server in the call center identifies the attachment to be sent, and extracts the attachment from the email message. When the attachment is ready to be sent to the mobile vehicle, the call center server sends a download request signal to the vehicle telematics unit **120** indicating that the server is ready to send the attachment.

When the telematics unit **120** in the user's mobile vehicle receives the download request from the call center server, the telematics unit **120** responds by setting an internal software flag, as indicated in step **212** of FIG 2. The internal software flag is computer code that triggers the sequence to download the attachment when the user's telephone call to the call center ends. When the user terminates the call to the call center, the attachment is sent from the call center server through the call center data transmission device to the mobile vehicle. The attachment is downloaded to the telematics unit **120** using a modem in the mobile vehicle, and temporarily stored in the random access memory **128** of the telematics unit **120**, as indicated in step **214**.

Once the email attachment is received in the telematics unit, the telematics unit **120** determines which communications unit within the mobile vehicle should be used to make the attachment available to the user, as shown in step **216**.

As shown in FIG. 3, an email message **300** comprises the text message **302**, and may optionally include an attachment **310** to the email message. Email attachment **310** may include elements that are audio, video, pictures, or text. The audio elements include sound files in .voc, .snd, .ogg, .cda and .mid format, music files in .ram, .wav, .wma, and mp3 format. The video medium includes files in .avi, .mpg, .wmv, and .aiff format. A file which has both audio and visual elements is treated as a visual file, with visible elements displayed via the display screen **114** and the audio elements played over audio device **112**. Those of ordinary skill in the art will readily recognize the multitude of file formats used to store audio and visual files and understand that the invention is not limited by the file extension type.

Referring to FIG. 2, the telematics unit **120** has an internal lookup table that identifies the type of medium included in the attachment and determines whether the attachment is audio-only (sound or music), or whether there is also a visual element. The telematics unit **120** will route audio-only attachments to the audio device **112**. Attachments having a visual component including video, pictures, or text will be routed to the display screen **114** by the telematics unit **120**. Once the telematics unit **120** has made the determination, using computer code, it sets a bit in memory that routes the attachment to the selected communications unit. The attachment is then sent to the selected communications unit and is available to the user, as indicated in step **218** of FIG. 2. In one embodiment of the invention, if the attachment is audio-only, it is sent to the audio device **112**, and the user can listen to the attachment through the radio speakers of the mobile vehicle sound module. If the attachment includes a visual element, the attachment is sent to the display screen **114**

After the attachment has been routed to the appropriate communications device, the attachment is deleted from the random access memory **128** of the vehicle telematics unit **120** and the internal software flag is deleted, as is indicated in step **220**.

In one embodiment, when the mobile vehicle is turned off, the attachment is lost, and if needed, it must be downloaded again from the server. In other embodiments, the attachment is stored in non-volatile memory and preserved until affirmatively deleted by the user.

While the invention has been described with reference to particular embodiments, it will be understood by one skilled in the art that variations and modifications may be made in form and detail without departing from the spirit and scope of the invention.